

REMARKS

By this amendment, claims 1-2 and 15 have been amended. The specification has been amended to correct certain informalities. Accordingly, claims 1-20 are currently pending in the application, of which claims 1, 17, and 20 are independent claims.

Applicants respectfully submit that the above amendments do not add new matter to the application and are fully supported by the specification. Support for the amendments and added claims may be found at least in Figures 1-2 and at paragraphs [0021]-[0022] and [0027]-[0028] of the specification.

In view of the above amendments and the following Remarks, Applicants respectfully request reconsideration and timely withdrawal of the pending objections and rejections for the reasons discussed below.

Drawing Objection

In the Office Action, the drawings were objected to as failing to comply with 37 CFR 1.84(p)(5).

The specification has been amended to describe Figure 1. Accordingly, Applicants respectfully request withdrawal of the drawing objection.

Specification Objection

In the Office Action, the specification was objected to because of informalities.

The specification has been amended to correct the informalities. Accordingly, Applicants respectfully request withdrawal of the objection to the specification.

Rejections Under 35 U.S.C. § 112, first paragraph

Claims 2, 5, 8, 13, and 14 stand rejected under 35 U.S.C. § 112, first paragraph as failing to comply with the enablement requirement. Applicants respectfully traverse this rejection for at least the following reasons.

The specification would enable one of ordinary skill in the art to make and use the present invention without undue experimentation. Paragraphs [0023]-[0025] and [0028] describe the location and function of the sensor in the fuel amount control system. The structure and operation of the two embodiments of the sensor are described in paragraphs [0029]-[0030] and [0036]-[0037] and Figs. 3-4. The material of the pressure film or pressure member of the sensor is also disclosed in paragraphs [0030] and [0036]. Paragraphs [0032] and [0039] and Figs. 5-6 show the substantially linear relationship between the volume change of the sensor and the concentration of fuel in a certain concentration range and show that the volume of the sensor does not change over time. Contrary to the Office Action, the disclosure provides a complete description of the sensor and the relationship between the sensor volume change and the fuel concentration. Therefore, one of ordinary skill in the art would be able to make and use the present invention without undue experimentation according to the disclosure.

Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. § 112, first paragraph rejection of claims 2, 5, 8, 13, and 14.

Rejections Under 35 U.S.C. § 112, second paragraph

Claims 5 and 8 stand rejected under 35 U.S.C. § 112, second paragraph as being indefinite. Applicants respectfully traverse this rejection for at least the following reasons.

The Office Action states that “[i]t is unclear what the applicant means by detecting the fuel concentration using characteristics that volumes of the sensor change depending on fuel concentration” (page 6, paragraph 14). The specification in paragraph [0024] indicates that the

volume of the sensor depends on the concentration of the fuel and that the sensor detects the fuel concentration according to the change in its volume. Claims 5 and 8 point out this feature of the present invention.

Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. § 112, second paragraph rejection of claims 5 and 8.

Rejections Under 35 U.S.C. § 102

Claim 1 stands rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by U.S. Patent No. 6,303,244 issued to Surampudi, *et al.* ("Surampudi").

In order for a rejection under 35 U.S.C. § 102(b) to be proper, a single reference must disclose every claimed feature. To be patentable, a claim need only recite a single novel feature that is not disclosed in the cited reference. Thus, the failure of a cited reference to disclose one or more claimed features renders the 35 U.S.C. § 102(b) rejection improper.

Amended claim 1 recites, *inter alia*:

a fuel storage unit that stores the fuel to be supplied to the fuel cell stack;
a diluent storage unit that stores *only* a diluent that is a byproduct of the chemical reaction in the fuel cell stack (emphasis added)

Surampudi fails to disclose at least such features. Rather, Surampudi discloses that methanol from a methanol tank 900 and water from a water tank 908 are pumped to the circulation tank 906 (col. 18, lines 5-10). Hence, the circulation tank 906 does not teach the diluent storage unit of the present invention because the circulation tank 906 does not store "only a diluent that is a byproduct of the chemical reaction in the fuel cell stack". Therefore, Surampudi fails to teach or suggest each and every claimed feature of the present invention.

Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. § 102(b) rejection of claim 1. Claims 2-16 depend from claim 1 and are allowable at least for this reason. Since none of the other prior art of record discloses or suggests all the features of the claimed

invention, Applicants respectfully submit that independent claim 1, and all the claims that depend therefrom, are allowable.

Rejections Under 35 U.S.C. § 103

Claim 2 stands rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Surampudi as applied to claim 1 above in view of U. S. Patent No. 6,890,674 issued to Beckmann, *et al.* ("Beckmann").

Applicants respectfully submit that claim 1 is allowable over Surampudi and Beckmann fails to cure the deficiencies of Surampudi noted above with regard to claim 1. Hence, claim 2 is allowable at least because it depends from an allowable claim 1.

Claims 3-4 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Surampudi as applied to claim 1 above in view of U. S. Patent No. 6,686,081 issued to Gottesfeld ("Gottesfeld").

Applicants respectfully submit that claim 1 is allowable over Surampudi and Gottesfeld fails to cure the deficiencies of Surampudi noted above with regard to claim 1. Hence, claims 3-4 are allowable at least because they depend from an allowable claim 1.

Claims 5-8 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Surampudi in view of Gottesfeld as applied to claims 1, 3, and 4 above, and further in view of Beckmann.

Applicants respectfully submit that claim 1 is allowable over Surampudi and Gottesfeld and Beckmann fails to cure the deficiencies of Surampudi and Gottesfeld noted above with regard to claim 1. Hence, claims 5-8 are allowable at least because they depend from an allowable claim 1.

Claims 9-16 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Surampudi as applied to claim 1 above and in view of U.S. Patent No. 6, 306, 285 issued to Narayanan et al. ("Narayanan"), Beckmann, and U.S. Patent No. 5,033, 293 issued to Honma et al. ("Honma").

Applicants respectfully submit that claim 1 is allowable over Surampudi and Narayanan, Beckmann, and Honma fail to cure the deficiencies of Surampudi noted above with regard to claim 1. Hence, claims 9-16 are allowable at least because they depend from an allowable claim 1.

Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. § 103(a) rejection of claims 2-16. Since none of the other prior art of record, whether taken alone or in any combination, discloses or suggests all the features of the claimed invention, Applicants respectfully submit that claims 2-16 are allowable.

Claims 17, 18, and 19 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Narayanan in view of Beckmann and U.S. Publication Application No. 2001-0037000 issued to Goto, et al. ("Goto"). Claim 20 stands rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Narayanan in view of Beckmann. Applicants respectfully traverse this rejection for at least the following reasons.

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the reference or references, when combined, must disclose or suggest all of the claim limitations. The motivation to modify the prior art and the reasonable expectation of success must both be found

in the prior art and not based upon a patent applicant's disclosure. *See in re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The examiner has failed to establish a prima facie case of obviousness because there is no motivation to combine Narayanan and Beckmann. Narayanan discloses a concentration sensor that operates on the principle of the electrochemical oxidation of the fuel under mass transport limited conditions (col. 3, lines 25-30). Beckmann discloses a concentration sensor using a material that expands depending on the concentration of methanol fuel in a fuel solution and causes a change in resistance of a conductor (col. 8, lines 53-60). Although NAFION™ may be used in the devices of Narayanan and Beckmann, it is used in two different elements. Beckmann uses NAFION™ as the expansion material that directly monitors the fuel concentration while Narayanan uses NAFION™ as the solid electrolyte membrane. Narayanan does not teach or suggest that NAFION™ or the electrolyte membrane changes volume depending on the fuel concentration or is used to detect the fuel concentration. Rather, in Narayanan the mass transport of methanol to the surface of the anode controls the current, and the current indicates the concentration of methanol (col. 5, lines 1-8). Since NAFION™ is used in two different sensors for two different functions, there is no suggestion or motivation to use the NAFION™ of Narayanan as a sensor film or a sensor member as in Beckmann.

Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. § 103(a) rejection of claims 17 and 20. Claims 18-19 depend from claim 17 and are allowable at least for this reason. Since none of the other prior art of record, whether taken alone or in any combination, discloses or suggests all the features of the claimed invention, Applicants respectfully submit that independent claims 17 and 20, and all the claims that depend therefrom, are allowable.

CONCLUSION

Applicants believe that a full and complete response has been made to the pending Office Action and respectfully submit that all of the stated objections and grounds for rejection have been overcome or rendered moot. Accordingly, Applicants respectfully submit that all pending claims are allowable and that the application is in condition for allowance.

Should the Examiner feel that there are any issues outstanding after consideration of this response, the Examiner is invited to contact Applicants' undersigned representative at the number below to expedite prosecution.

Prompt and favorable consideration of this Reply is respectfully requested.

Respectfully submitted,

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